

REMARKS

Claims 10-13 are now pending in the application.

Claims 10-13 were rejected under 35 USC 103 (a) as being obvious over US Patent Publication No. US-2003-0139523-A1 to Nakamura et al.(hereinafter also referred to as “Nakamura”) in view of US Patent Publication No. US-2003-0220437-A1 to Hopkins et al. (hereinafter also referred to as “Hopkins”) and further in view of US Patent 4,748,168 to Kawakami et al. (hereinafter also referred to as “Kawakami”).

The cited references do not render obvious claims 10-13.

As is clear from the disclosure of the present application and as recited in claims 10-13, important to the present invention is the use, in the tire tread rubber composition, of (i) the specified aromatic vinyl-conjugated diene copolymer rubber (A) having a Tg (i.e., TgA) of -40° to -5°C and the specified conjugated diene-based rubber gel (B), wherein the Tg of (B) (i.e., TgB) satisfy the relationship (1)

$$TgA - 10 < TgB < TgA + 10 \quad (1).$$

As a result, the wet performance, the abrasion resistance and the low heat buildup property are improved (see, the third aspect of the present invention in the specification). This is neither disclosed nor taught in the cited references, as will be discussed below.

US Patent Publication No. US-2003-0139523-A1 to Nakamura et al. suggests a conjugated diene rubber, a rubber composition containing the same and a process for producing the conjugated diene rubber.

However, as appreciated by the Examiner, Nakamura neither discloses nor teaches (a) the use of the aromatic vinyl-conjugated diene copolymer rubber (A) having a TgA -40°C to -5°C and (b) the use of the conjugated diene-based rubber gel (B) having a TgB satisfying the following formula (1):

$$TgA - 10 < TgB < TgA + 10 \quad (1)$$

as the tire tread rubber composition according to the present invention.

As shown in the results on Tables III-2 and III-3, when only SBR-2 having a TgA of -50°C is used as the component (A) (see Comp. Examples III-1 and III-4), the desired results cannot be obtained. In addition, when the rubber gel (B) is not used (see Comp. Example III-2) or when TgB is not within the range of $TgA \pm 10^{\circ}\text{C}$ as in Comp. Examples III-3 and III-4, the desired results are not obtained. This is completely absent in Nakamura et al.

It is concluded in the Office Action that Hopkins teaches emulsion and solution polymerized SBR having a Tg above -50°C ([0041] thereof). However, Hopkins neither discloses nor teaches the use of the above-specified SBR, in combination with the conjugated diene-based rubber gel (B) having the specified TgB satisfying the above relationship (1).

Kawakami discloses the use of the first group of styrene-butadiene copolymers with a Tg of -20°C to -45°C (i.e., styrene-rich SBR) and a second group of styrene-butadiene copolymers with a Tg of lower than -45°C (i.e., styrene-poor SBR) (see column 2, lines 21-29). However, Kawakami neither discloses nor teaches the use of the SBR having such a Tg, in combination with the conjugated diene-based rubber gel (B) having the above-mentioned specified TgB.

As evidenced by the results of the previously filed Declaration under 37 CFR 1.132 by Naoya Amino, even when the two SBRs (not the rubber gel) having the specified TgA and TgB: $(TgA - 10 < TgB < TgA + 10)$ defined in the present invention are used, the desired results can not be obtained. Thus, the results obtainable by the present invention are by no means expected from the cited references by those skilled in the art.

In the Final Office Action, in reliance upon column 2, lines 21-31, it was stated that Kawakami show glass transition temperatures that are close to equal. However, the disclosure in column 2, lines 21-31 does not explicitly state that glass transition temperatures that are close to equal should be selected. In particular, column 2, lines 21-31 states as follows:

“Starting rubbers eligible for the purpose of the present invention include a first group of styrene-butadiene copolymer rubbers with a glass-transition temperature between -20°C and -45°C (hereinafter referred to as "styrene-rich SBR") and a second group of styrene-butadiene copolymer rubbers with a glass-transition temperature lower than -45°C (hereinafter referred to as "styrene-poor SBR").” This statement does not teach that the Tg of the "styrene-poor SBR" must be close to or equal the Tg of the "styrene-rich SBR". In fact, the examples in Kawakami that are to demonstrate the invention therein have Tgs that differ more than 10°C from each other.

In the Final Office Action it was stated that Kawakami is used to show that, when two rubber components are used in a composition, whether it be a rubber/rubber blend or a rubber/rubber gel blend, it is advantageous to have the glass transition temperature of each component be similar in order to ensure compatibility between the two components. Kawakami does not actually state that the two components should be compatible and it would not be apparent from Kawakami that they should be compatible. In fact, with respect to the present invention, the diene copolymer (A) and the diene-based rubber gel (B) are actually incompatible.

Contrary to the above conclusion in the Final Office Action, to achieve desired properties for a tire tread incompatibility as contrasted to compatibility is desired. Along these lines, it is known in the art, as shown in, for example, in paragraph [0007] of JP2001-139729A¹, which corresponds to col. 2, lines 5 - 28 of US Patent 6,403,720B1, copies of which are attached hereto, that, when the gelled rubber having a toluene swelling index of 16 - 150 is blended, as the high Tg polymer, to a low Tg polymer of a diene rubber, the incompatibility of the two polymers is promoted, the $\tan \delta$ around 0°C is improved and the abrasion resistance is not impaired to any significant extent or, in some cases, is even improved.

Contrary to the above, according to the present invention, the gelled diene rubber (B) having the relationship of

¹ JP2001-139729A is also discussed in the present specification at the first full paragraph on page 5.

$$\underline{T_gA - 10 < T_gB < T_gA + 10}$$

(i.e., T_gA and T_gB are not so much different is used), whereby $\tan \delta$ (0°C) can be improved, even when compared with the cases where T_gA and T_gB are very much different as in the case of JP'729 or US'720. Note, as mentioned above, that the diene copolymer (A) and the diene-based rubber gel (B) are incompatible even in the present invention (i.e., the present invention provides the excellent effects or results when compared with JP'729 or US'720).

As shown in JP'729 or US'720, when the rubber gel having the difference in the glass transition temperatures of at least 10°C (see claim 1 of US'081) is used, $\tan \delta$ (0°C) can be improved.

This is completely different from the present invention. Kawakami does not teach or even remotely suggest this difference between the rubber/rubber blend and the rubber/rubber gel blend. Consequently, it is clear that the present invention according to claims 10-13 is not rendered obvious by Nakamura, Hopkins and Kawakami.

The cited art lacks the necessary direction or incentive to those of ordinary skill in the art to render the rejections under 35 USC 103 sustainable. The cited art fails to provide the degree of predictability of success of achieving the properties attainable by the present invention needed to sustain a rejection under 35 USC 103. See *KSR Int'l Co. v. Teleflex, Inc.*, 127 S.Ct. 1727; 82 USPQ2d 1385 (2007), *Diversitech Corp. v. Century Steps, Inc.*, 7 USPQ2d 1315 (Fed. Cir. 1988), *In re Mercier*, 185 USPQ 774 (CCPA 1975) and *In re Naylor*, 152 USPQ 106 (CCPA 1966).

Moreover, the properties of the subject matter and improvements which are inherent in the claimed subject matter and disclosed in the specification are to be considered when evaluating the question of obviousness under 35 USC 103. See *KSR Int'l Co. v. Teleflex, Inc.*, 127 S.Ct. 1727; 82 USPQ2d 1385 (2007), *Gillette Co. v. S.C. Johnson & Son, Inc.*, 16 USPQ2d. 1923 (Fed. Cir. 1990), *In re Antonie*, 195 USPQ 6 (CCPA 1977), *In re Estes*, 164 USPQ 519 (CCPA 1970), and *In re Papesch*, 137 USPQ 43 (CCPA 1963). Please refer to the previously

filed Declaration under 37 CFR 1.132 by Naoya Amino, and Tables III-2 and III-3, discussed herein above.

No property can be ignored in determining patentability and comparing the claimed invention to the cited art. Along these lines, see *In re Papesch*, supra, *In re Burt et al*, 148 USPQ 548 (CCPA 1966), *In re Ward*, 141 USPQ 227 (CCPA 1964), and *In re Cescon*, 177 USPQ 264 (CCPA 1973).

In view of the above, consideration and allowance are respectfully solicited.

In the event the Examiner believes an interview might serve in any way to advance the prosecution of this application, the undersigned is available at the telephone number noted below.

The Office is authorized to charge any necessary fees to Deposit Account No. 22-0185, under Order No. 21713-00035-US1 from which the undersigned is authorized to draw.

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BAA/prb

Respectfully submitted,

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